

Simple Linear Regression in SPSS

Example 1 (Simple Linear Regression):

Fit a straight line to $Y = (\text{number of}) \text{ Jobs}$ as a function of $X = \text{GPA}$ to the following data:

| GPA | Jobs |
|-----|------|
| 3.5 | 24 |
| 3.3 | 23 |
| 2.6 | 18 |
| 2.8 | 20 |
| 3 | 22 |
| 2.3 | 15 |
| 2.4 | 17 |
| 2.7 | 17 |
| 3.2 | 22 |
| 3.5 | 25 |
| 2.9 | 21 |
| 3.5 | 25 |
| 2.2 | 13 |
| 3.8 | 27 |
| 2.7 | 18 |

Open the data file **JOB_GPA.xlsx** in SPSS, then click on Analyze/Regression/Linear (Figure 1a), which will open the window in Figure 1b, select Jobs as Response, GPA as Predictor, Linear Regression Model, then click on Graphs and select Four in One. (You can use Regression procedure as well, but Fitted Line Plot gives the best output in the case of a straight line model).

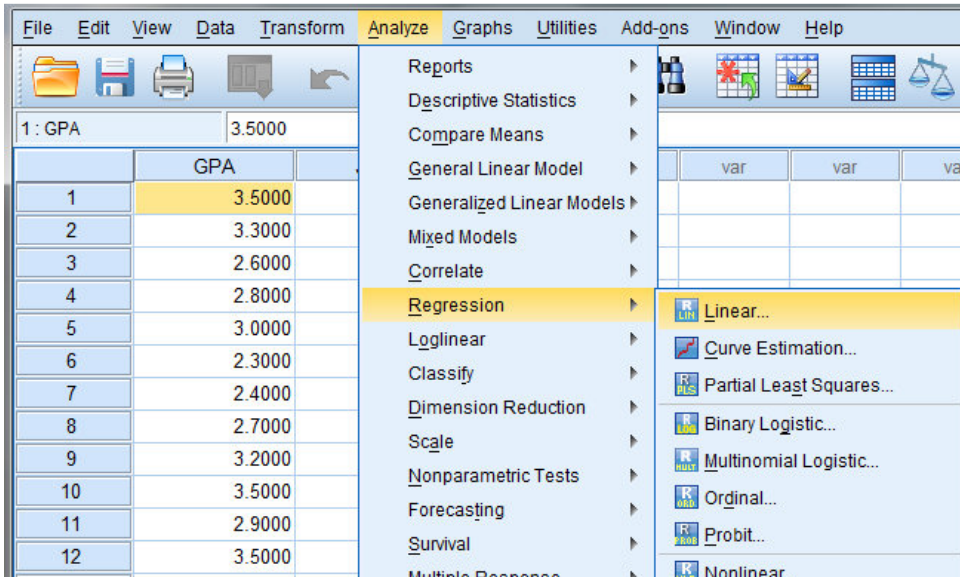


Figure 1a: Fitting a Straight Line in SPSS

Simple Linear Regression in SPSS

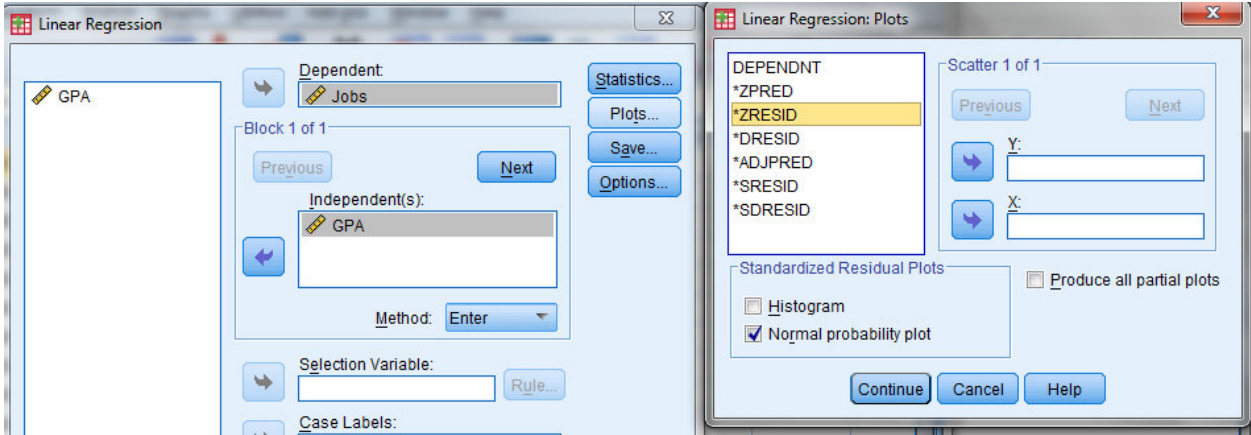


Figure 1b: Selecting Variables and Residual Plots in Fitted Line Plot in SPSS

Figure 1c shows the output from SPSS.

ANOVA^b

| Model | | Sum of Squares | df | Mean Square | F | Sig. |
|-------|------------|----------------|----|-------------|---------|-------------------|
| 1 | Regression | 220.438 | 1 | 220.438 | 308.291 | .000 ^a |
| | Residual | 9.295 | 13 | .715 | | |
| | Total | 229.733 | 14 | | | |

a. Predictors: (Constant), GPA

b. Dependent Variable: Jobs

Coefficients^a

| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. |
|-------|------------|-----------------------------|------------|---------------------------|--------|------|
| | | B | Std. Error | Beta | | |
| 1 | (Constant) | -3.452 | 1.380 | | -2.502 | .026 |
| | GPA | 8.081 | .460 | .980 | 17.558 | .000 |

a. Dependent Variable: Jobs

Residuals Statistics^a

| | Minimum | Maximum | Mean | Std. Deviation | N |
|----------------------|---------|---------|-------|----------------|----|
| Predicted Value | 14.33 | 27.25 | 20.47 | 3.968 | 15 |
| Residual | -1.366 | 1.210 | .000 | .815 | 15 |
| Std. Predicted Value | -1.548 | 1.711 | .000 | 1.000 | 15 |
| Std. Residual | -1.615 | 1.431 | .000 | .964 | 15 |

a. Dependent Variable: Jobs

Figure 1c: Output from SPSS

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The fitted line is $Y = -3.452 + 8.081 \text{ GPA}$, with $R^2 = 96\%$.

Figure 1d is the Residual Plots obtained from SPSS, which shows that the residuals from the straight line model are normally distributed, and hence the linear regression results are valid.

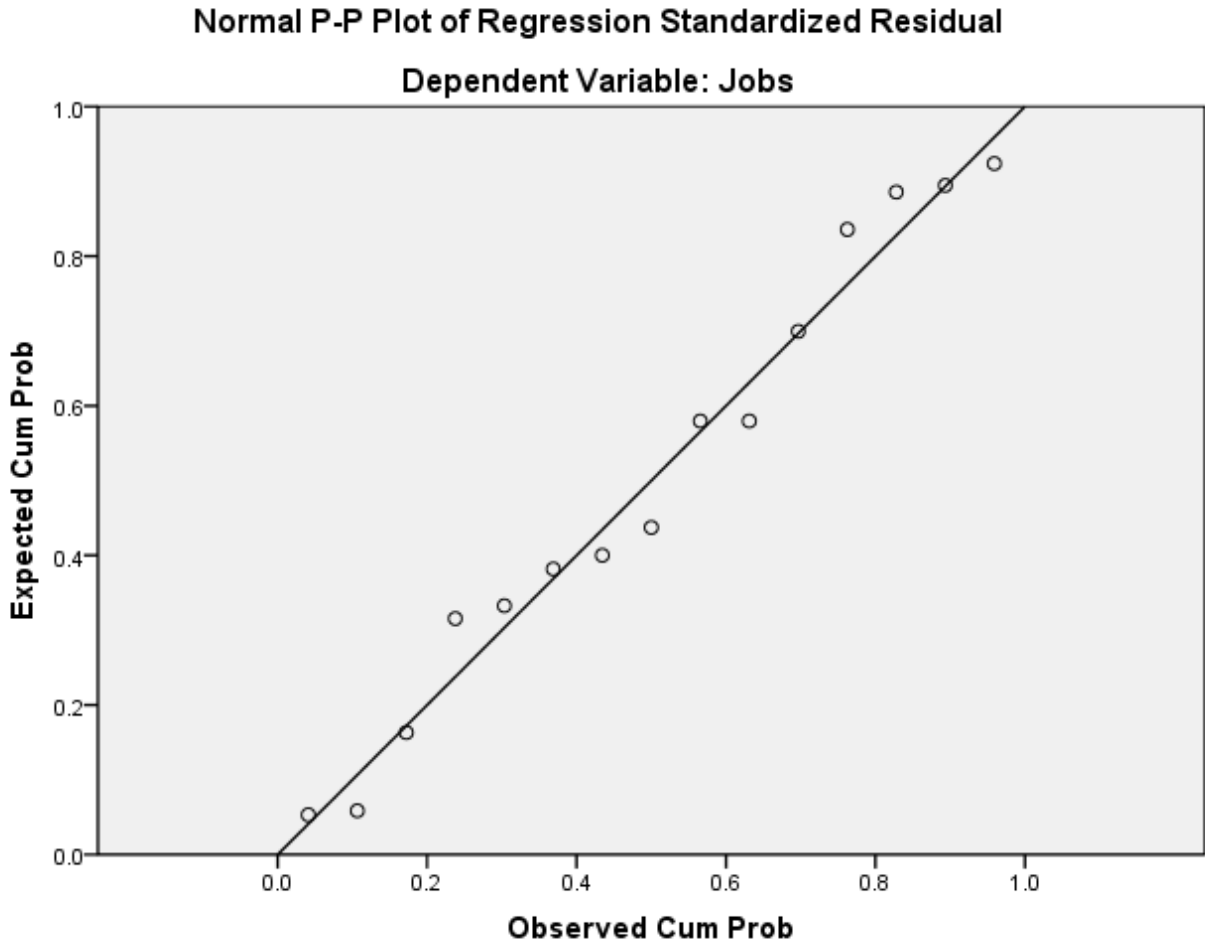


Figure 1d: Residual Plots obtained from SPSS.